

The Epidemiology of Psychiatric Disorders Among Repeat DUI Offenders Accepting a Treatment-Sentencing Option

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Psychiatric comorbidity likely contributes to driving under the influence (DUI) of alcohol among repeat offenders. This study presents one of the first descriptions of the prevalence and comorbidity of psychiatric disorders among repeat DUI offenders in treatment. Participants included all consenting eligible admissions ($N = 729$) to a 2-week inpatient treatment facility for court-sentenced repeat DUI offenders (i.e., offenders electing treatment in place of prison time) from April 17, 2005, to April 23, 2006. Participants completed the Composite International Diagnostic Interview, which assessed the following disorders using criteria from the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; American Psychiatric Association, 1994): alcohol use and drug use, bipolar, generalized anxiety, posttraumatic stress, intermittent explosive, conduct, attention deficit, nicotine dependence, pathological gambling, and major depressive. Repeat DUI offenders evidenced higher lifetime and 12-month prevalence of alcohol use and drug use disorders, conduct disorder, posttraumatic stress disorder, generalized anxiety disorder, and bipolar disorder compared with the general population. Almost half qualified for lifetime diagnoses of both addiction (i.e., alcohol, drug, nicotine, and/or gambling) and a psychiatric disorder. Lifetime and past-year comorbidity rates were higher among participants than in the general population. These results suggest that clinicians should consider multimorbidity within DUI treatment protocols.

Keywords: alcohol abuse, comorbidity, epidemiology, driving under the influence

Like heart disease, cancer, domestic violence, and sexually transmitted diseases, driving under the influence of alcohol (DUI) continues to be a primary public health concern. The U.S. National Highway Traffic Safety Administration (NHTSA) reported that, in

2004, alcohol was involved in 39% of fatal crashes and that 248,000 people were injured or killed in alcohol-related crashes (NHTSA, 2006). These fatalities and injuries contribute to enormous but avoidable financial and human costs. Taylor, Miller, and Cox (2002) estimated that the annual economic cost of alcohol-related accidents is roughly \$51.1 billion. Furthermore, there is evidence that the majority of DUI offenders go undetected. For example, in 1998, the Centers for Disease Control reported that only 1% of the DUI episodes reported by U.S. adults resulted in arrest (Centers for Disease Control, 2006). More than 80% of alcohol-impaired drivers who caused accidents and were admitted to hospital emergency departments were not prosecuted for their offense (Orsay, Doan-Wiggins, Lewis, Lucke, & RamaKrishnan, 1994), a statistic that reveals DUI is an even larger problem than the arrest and conviction rate statistics indicate.

Reducing DUI Behavior

NHTSA (2001) suggests that there are four legal approaches for addressing DUI offenses: (a) licensing sanctions, (b) vehicle sanctions, (c) mandatory alcohol abuse treatment and education, and (d) mandatory sentencing. These policies are meant to raise awareness about the dangers of drinking and driving or to increase penalties for DUI behavior. Such DUI policies target (a) individuals who are not aware of these dangers and (b) individuals for whom harsh potential consequences should deter the decision to drink and to drive. Treatment programs for convicted DUI offenders have been an integral feature of the criminal justice system for

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about the past 30 years (e.g., Nochajski & Stasiewicz, 2006; Williams, 2006). Some of these treatment programs define addiction as a central feature of DUI (Nochajski & Stasiewicz, 2006) and of its treatment (e.g., Donovan, Marlatt, & Salzborg, 1983; Marlatt, Baer, Donovan, & Kivlahan, 1988). The criminal justice and addiction approach has met with some success (e.g., Glass, Chan, & Rentz, 2000; NHTSA, 2000; Nochajski & Stasiewicz, 2006; Williams, 2006). These legal approaches and specific policy interventions, such as lowering the legal blood alcohol concentration and mandating stricter vehicle safety measures, have reached their intended targets and have helped reduce alcohol-related fatalities by 21% since 1982 (NHTSA, 2006). Unfortunately, the reduction in the proportion of traffic fatalities that are alcohol-related has leveled off during recent years: Since 1993, rates have hovered between 39% and 43% (NHTSA, 2002, 2004a, 2006). The recent stagnation in DUI fatality reduction after the earlier decline suggests that targeting only individuals who are not aware of the dangers of DUI and individuals who respond to harsh legal consequences is insufficient. New and enhanced treatment-matching strategies (e.g., Wells-Parker, Dill, Williams, & Stoduto, 2006; Wells-Parker & Williams, 2002) are showing considerable promise, but these protocols are not yet widely available. The failure to continue reduction of DUI reveals that a subset of the DUI offender population is nonresponsive to the current intervention efforts and that different strategies will be necessary for further reduction of DUI behavior (Yu, Evans, & Clark, 2006). In a recent review, Williams (2006) noted that DUI remains a public health concern and deserves our continuing attention. However, before public health professionals can develop new interventions, additional research is necessary for determination of the characteristics of DUI offenders who are resistant to traditional interventions.

Psychiatric Comorbidity and DUI Behavior

Research suggests that psychiatric disorders can decrease the effectiveness of substance abuse treatment (Albanese, 2001; Albanese & Shaffer, 2003; Bradizza, Stasiewicz, & Paas, 2006). Untreated or partially treated psychopathology might contribute to the persisting rate of DUI events and fatalities. Some research suggests that rates of psychiatric disorders, including substance use disorders and depression, are elevated among DUI offenders (Lapham, C'de Baca, McMillan, & Lapidus, 2006; Lapham et al., 2001; Oslin, O'Brien, & Katz, 1999) and that there might be an association between various psychiatric disturbances and disorders and DUI reoffense (e.g., Cavaola, Strohmetz, & Abreo, 2007; C'de Baca, Miller, & Lapham, 2001; Donovan et al., 1983; Glass et al., 2000; Hunter, Wong, Beighley, & Morral, 2006; McMillen, Adams, Wells-Parker, Pang, & Anderson, 1992; Nochajski & Stasiewicz, 2006; Wells-Parker et al., 2006).

Lapham et al. (2001) conducted one of the first studies to assess psychiatric disorders among DUI offenders comprehensively. Using a sample of primarily first-time offenders, this research revealed that 85% of women and 91% of men referred to a DUI program met the diagnostic criteria for alcohol dependence or abuse; 32% of the women and 38% of the men had a drug use disorder. For offenders with alcohol use disorders, 50% of women and 33% of men had at least one additional psychiatric disorder, primarily posttraumatic stress disorder or major depression. Although they did not focus on diagnostic categories, McMillen et al. (1992), using a personality

measure (Minnesota Multiphasic Personality Inventory) and the Alcohol Use Inventory, found that multiple offenders, compared with first-time offenders, had increased rates of mania, depression, hostility, alcohol and other drug consumption, alcohol- and drug-related problems, traffic accidents, and nontraffic arrests. Similarly, Cavaola et al. (2007) reported that elevated validity scale scores (L, lie or "fake good"; F, "fake bad"; and K, defensiveness) on the Minnesota Multiphasic Personality Inventory predicted relapse among first-time DUI offenders.

Repeat DUI Offenders

Repeat DUI offenders likely contribute to consistent rates of DUI accidents and deaths. Statistics (NHTSA, 2004b) reveal that up to one third of DUI arrestees are repeat offenders. Repeat DUI offenders also are disproportionately responsible for DUI-related harms, as evidenced by their significant involvement in alcohol-related driving fatalities. Among drivers involved in fatal crashes, those with blood alcohol concentration levels of 0.08% or higher were nine times more likely to have a prior conviction for driving while impaired than were drivers who had not consumed alcohol (NHTSA, 2006). Other research suggests that drivers who die in alcohol-related crashes are more than four times more likely to have a history of DUI arrest than are drivers who die in non-alcohol-related crashes (Brewer et al., 1994; NHTSA, 2006). These statistics, coupled with the fact that repeat offenders perpetuate their behavior despite the negative consequences of past arrest, suggest that repeat offenders represent a group that is distinct not only from the general population but also, possibly, from the majority of first-time DUI offenders.

During the past 30 years, various investigators have identified and implicated comorbid psychiatric disorders and demographic attributes (e.g., gender, age, reduced acculturation) as causal influences for DUI relapse (Cavaola et al., 2007; C'de Baca et al., 2001; Glass et al., 2000; Hunter et al., 2006; Lapham et al., 2001; Nochajski & Stasiewicz, 2006; Wells-Parker & Williams, 2002). However, only Lapham et al. (2006) reported the epidemiology of psychiatric disorders for a repeat DUI offender population with a comprehensive measure of diagnoses from the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; *DSM-IV*; American Psychiatric Association, 1994). They reported that, in addition to alcohol abuse or dependence, 50% of their sample had a lifetime drug use disorder, more than 30% qualified for depression, and more than 15% had experienced posttraumatic stress disorder. Though the rates of psychiatric comorbidity were similar to those that these researchers found within their first-offender sample (Lapham et al., 2001), the rate of drug use disorders was much higher among repeat offenders. Because repeat offenders are responsible for a disproportionate public health burden, it is important to continue examination of the extent and patterns of psychopathology among this specific population. Creation of a comprehensive epidemiological profile of psychopathology among repeat DUI offenders mandated to treatment is fundamental to advancement of our understanding of DUI and development of optimal clinical interventions. Because psychiatric disorders tend to decrease the efficacy of substance abuse treatment and to increase relapse (Albanese, 2001; Albanese & Shaffer, 2003; Bradizza et al., 2006), unrecognized psychopathology likely limits the value of clinical efforts to curtail DUI reoffense.

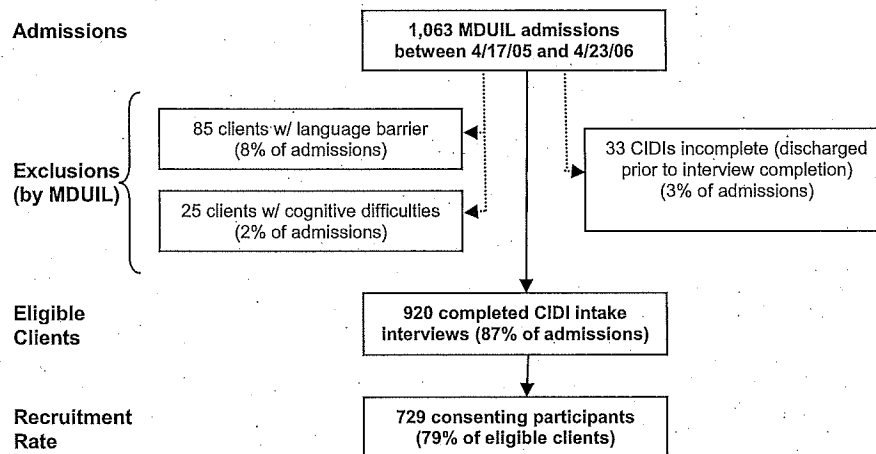


Figure 1. Study eligibility and recruitment. MDUIL = Middlesex Driving Under the Influence of Liquor Program; CIDI = Composite International Diagnostic Interview.

Current Study

This article represents one of the first studies to use systematic methods and measures to report comprehensively the psychiatric epidemiology and multimorbidity among repeat DUI offenders attending court-mandated treatment in place of incarceration. Previous studies of repeat and first-time DUI offenders have used disparate methods and measures, a fact that limits their comparability. The current study measures psychiatric disorders with a widely used comprehensive diagnostic instrument that has been employed both in Lapham's recent work with repeat offenders and in general population studies. The current study builds upon the work of Lapham and her colleagues (2001, 2006) by including more possible diagnoses, comparing the rates for repeat offenders with rates obtained in the general population using an identical instrument, and analyzing the level of comorbidity among repeat offenders. We hypothesized that repeat offenders would exhibit all measured Axis I psychiatric disorder at rates higher than those of the general population and that comorbidity would be common in this population. By providing a psychiatric epidemiology of repeat offenders in treatment, this research holds the potential to inform clinical efforts that address psychopathology and that consequently help to curtail recidivism.

Method

Participants

The Middlesex Driving Under the Influence of Liquor Program (MDUIL), a mandated 2-week inpatient treatment program for repeat DUI offenders who elect a treatment-sentencing option instead of incarceration, had 1,063 consecutive admissions between April 17, 2005, and April 23, 2006. Of those admitted, 920 (87%) completed the Composite International Diagnostic Interview (CIDI) at intake. MDUIL did not complete CIDs with clients who required interpreters (8% of admissions), who were discharged early (3% of admissions), or who, in the program director's judgment, had severe cognitive difficulties (2% of admissions); these clients were given a

different intake assessment and were not eligible for this study. Of the 920 study-eligible admissions, we successfully recruited 729 clients (i.e., 79% of eligible admissions and 69% of all consecutive admissions) into this study. Figure 1 summarizes the CIDI completion and study recruitment rates.

Participants were 81% male. Information available from the MDUIL program indicated that the gender proportions of the sample were similar to those of all admissions (i.e., 82% male) during the study time period. The sample was 88% Caucasian, 5% Hispanic, 5% African American, 1% Native American, and 1% Asian. The gender and race distribution in the counties served by MDUIL was 48%–53% female, 65%–96% Caucasian, 2%–18% Hispanic, 2%–25% African American, 1%–8% Asian, and less than 1% Native American. MDUIL's race distribution was most similar to the less metropolitan counties.

Participants ranged in age from 19 to 77 years ($M_{\text{age}} = 39.7$ years, $SD = 11.6$). Of the participants, 19% were married, 28% were divorced or separated, 2% were widowed, and 52% had never married. Personal income ranged from \$0 to \$100,000+. Among those sampled, 32% had an income below \$20,000, 42% had an income between \$20,000 and \$49,999, 13% had an income between \$50,000 and \$74,999, and 9% had an income of \$75,000 or more. (Four percent did not report their income.) Seventy-two percent of the sample had a high school education or less, and 63% were employed at the time of the study. Sixty-two percent of the sample reported 2 DUI convictions, and 36% reported more than 2 (range = 3–10).¹ The mean number of DUI convictions reported by participants was 2.5 ($SD = 1.0$).

Procedures

MDUIL, a 2-week inpatient DUI treatment facility for court-sentenced repeat DUI offenders, implemented a structured, com-

¹ Just 2% of participants reported one DUI arrest; however, the DUI program they attended admits only offenders with two or more DUI arrests on their record.

puterized mental health assessment instrument (i.e., the CIDI) as part of its program intake. During this study, MDUIL was one of two residential facilities in the state licensed by the Massachusetts Department of Public Health for provision of services to repeat DUI offenders. In the state of Massachusetts, under Chapter 90, Section 24, of the General Laws of Massachusetts (2005), repeat DUI offenders (i.e., offenders who have been convicted of more than one DUI offense in Massachusetts) can receive an alternative sentence to incarceration. Specifically, the alternative requires 2 years of supervised probation and a treatment condition of no less than 14 days in a residential treatment program, such as MDUIL, followed by outpatient aftercare programming for the duration of probation. If this option is not elected, offenders must serve no less than 30 days in prison (General Laws of Massachusetts, 2005). Clients who attend MDUIL receive group and individual counseling sessions that provide education on methods for abstinence from alcohol and from other drugs and on the physical effects of alcohol and of drug abuse. Participants are required to attend an Alcoholics Anonymous meeting, two group counseling sessions, and two to three educational classes during each day of the program. Individual counseling sessions are conducted several times each week.

MDUIL served 53% of the repeat offenders in Massachusetts who were sentenced to treatment and who agreed to it in place of prison time. MDUIL received admissions from 37 of the 39 district courts, which represented all of the counties, both urban and rural, in the eastern half of the state during the study period. The 47% of repeat offenders sentenced to treatment who did not attend MDUIL received sentences in the western half of the state and attended treatment at the other state-licensed facility, mentioned above.

This study received approval from the Cambridge Health Alliance Institutional Review Board. Project staff (i.e., Sarah E. Nelson, Howard J. Shaffer, and Gabriel Caro) trained MDUIL counselors in the use of the CIDI prior to the study. An initial 3-month period was defined as the pretest period for use of the CIDI technology at MDUIL. During this period, only selected clients were interviewed, as MDUIL staff learned how best to administer the instrument and to integrate the CIDI into the program intake process. After the pretest period, counselors administered the CIDI to all of their eligible clients within the 1st week of each 2-week patient cohort. (See Figure 1.) The average length of the interview was 90 min; interviews ranged between 45 and 210 min.

Prior to discharge of clients from the MDUIL program, research staff met with them to obtain written informed consent for the use of their intake information and to enroll them in the study. Clients who agreed to participate received a \$25 gift card from a grocery or a department store.

Instrument

We employed Version 19.101 of the computerized CIDI (Kessler & Ustun, 2004) as the intake assessment at MDUIL. The CIDI is a comprehensive, standardized, and computer-guided instrument for the assessment of substance use and other mental disorders in accordance with the definitions and criteria of the *International Classification of Diseases, Tenth Revision (ICD-10; World Health Organization, 1992)*, and of the *DSM-IV*. It applies these criteria to measure the presence, age of onset, and remission

of disorders. The CIDI is employed worldwide; it is one of the most comprehensive and thorough instruments currently available for use in diagnosis of substance use and of psychiatric disorders (e.g., Kessler, Abelson, et al., 2004; Kessler, Demyttenaere, et al., 2004; Kessler & Ustun, 2004; Kessler et al., 1998). The CIDI's favorable psychometric properties include (a) high concurrent validity for substance use disorders, with a kappa of .83 measured against *ICD-10* criteria (Janca, Robins, Cottler, & Early, 1992); (b) relative stability of the CIDI's time-related symptom items, with a test-retest concordance of 72.7% (intraclass correlation coefficient = .86) for age of abuse-dependence onset and 86.0% agreement for recency items (Wittchen et al., 1989); and (c) good reliability and convergent validity with other diagnostic screening procedures (Andrews & Peters, 1998; Lachner et al., 1998; Peters & Andrews, 1995; Ustun et al., 1997). The National Comorbidity Survey Replication (NCS-R; Kessler, Berglund, et al., 2004) used the version of the CIDI employed in the current study as its primary instrument; this circumstance provided us with a normative community comparison group for the MDUIL data analyses.

The CIDI includes 21 modules that assess *DSM-IV* diagnostic criteria for Axis I disorders. MDUIL initially selected 8 of these modules and later added 2 more modules, on the basis of its needs and of an assessment of the modules clients tended to screen into during the pretest period. The CIDI modules used at MDUIL provided *DSM-IV*-based lifetime and past-year diagnoses for alcohol dependence, alcohol abuse, drug dependence, drug abuse, nicotine dependence, pathological gambling, major depression, mania, hypomania, dysthymia, generalized anxiety disorder, post-traumatic stress disorder, intermittent explosive disorder, conduct disorder, and attention-deficit disorder. The CIDI employs diagnostic exclusion rules for each of the following disorders: alcohol abuse—no diagnosis of alcohol dependence; drug abuse—no diagnosis of drug dependence; pathological gambling—no diagnosis of mania; major depression—no diagnosis of mania or hypomania; hypomania—no diagnosis of mania; dysthymia—no diagnosis of major depression during the first 2 years of dysthymic symptoms and no diagnosis of mania or hypomania; generalized anxiety—no temporally overlapping diagnosis of major depression; intermittent explosive disorder—no diagnosis of mania, conduct disorder, or attention-deficit disorder.

Two of the CIDI modules—intermittent explosive disorder and attention-deficit hyperactivity disorder—were administered starting with the fifth MDUIL cohort (i.e., after data had already been collected from 107 participants), because MDUIL reassessed the time available for intakes and suspected an elevated presence of these disorders in its population. In addition to administering the CIDI modules, MDUIL counselors collected client demographic information and arrest histories.

Analysis Plan

We applied SAS-based diagnostic algorithms, which were provided by the developers of the computerized CIDI (see www.hcp.med.harvard.edu/wmhcid/), to the data; this procedure yielded diagnoses for both lifetime and past 12-month time frames for the disorders listed in Table 1. We then used SPSS to conduct descriptive analyses for the entire sample, identifying lifetime and 12-month prevalence rates for each of the disorders. Because of the wide age range of our sample, we conducted logistic regressions to

Table 1
Lifetime and Past-Year Disorder Prevalence ($N_{MDUIL} = 729$)

Disorder	MDUIL		Gender-adjusted NCS-R rates ^a		Effect size (ϕ)	
	Lifetime prevalence (%)	Past-year prevalence (%)	Lifetime prevalence (%)	Past-year prevalence (%)	Lifetime	Past year
Addiction-related disorders						
Alcohol abuse	56.9*	42.4*	10.2	2.3	.35	.50
Alcohol dependence	40.7*	31.1*	7.1	1.7	.30	.43
Drug abuse	25.9*	4.9*	6.4	1.4	.22	.08
Nicotine dependence	15.9*	12.5*	8.9	4.3	.08	.12
Drug dependence	14.7*	5.1*	3.9	0.5	.16	.15
Pathological gambling	1.9	1.1	—	—	—	—
Psychiatric disorders						
Conduct disorder	17.8*	2.3	11.1	1.5	.08	.03
Posttraumatic stress disorder	13.3*	11.5*	4.8	2.4	.12	.16
Major depressive disorder	11.7	8.2*	14.2	5.4	-.02	.03
Generalized anxiety disorder	8.4*	6.6*	4.8	2.2	.04	.07
Attention-deficit disorder ^b	8.4	5.8	9.2	4.2	-.01	.03
Bipolar I or II disorder	7.3*	5.3*	4.3	2.9	.04	.04
(I with MDE)	(3.2)	(3.2)	—	—	—	—
(I without MDE)	(3.9)	(2.1)	—	—	—	—
(II)	(0.1)	(0.0)	—	—	—	—
Intermittent explosive disorder ^b	5.6	2.7	8.5	4.5	-.03	-.02
Dysthymia	3.3	2.7*	2.0	1.2	.02	.04

Note. Dashes indicate that no data are available. MDUIL = Middlesex Driving Under the Influence of Liquor Program; NCS-R = National Comorbidity Survey Replication; MDE = major depressive episode; DUI = driving under the influence (of alcohol).

* Significant difference between repeat DUI offenders and general population ($p < .01$).

^a NCS-R rates (Kessler, Berglund, Demler, Jin, & Walters, 2005; Kessler, Chiu, Demler, & Walters, 2005) have been adjusted by gender to reflect the gender composition of the MDUIL sample: 81% male, 19% female. We used the tables available at http://www.hcp.med.harvard.edu/ncs/ftpdir/table_ncsr_by_gender_and_age.pdf to perform this adjustment. The NCS-R sample for addiction-related disorders and posttraumatic stress disorder includes 5,692 cases. NCS-R sample for conduct disorder and attention-deficit disorder includes 3,199 cases. NCS-R sample for other psychiatric disorders includes 9,282 cases. ^b Percentage for repeat DUI offender sample based on subsample of 623 cases.

determine whether prevalence rates differed by age. For analysis, we collapsed the diagnoses for (a) mania and (b) hypomania with the presence of a major depressive episode into the category "Bipolar I or II"; this strategy replicates the NCS-R analytic algorithm (Kessler, Berglund, Demler, Jin, & Walters, 2005; Kessler, Chiu, Demler, & Walters, 2005). We measured both lifetime and 12-month comorbidity as the number of co-occurring disorders. We used regression analyses to determine whether comorbidity varied by age in our sample. We also compared prevalence rates and number of comorbid disorders between those offenders in our sample who reported two DUI offenses and those who reported more than two. In addition to describing the prevalence and the comorbidity of psychiatric disorders in our sample, we conducted chi-square analyses that compared our sample of repeat DUI offenders with the NCS-R sample.

Results

Prevalence of Psychiatric Disorders

Lifetime. Of those sampled, 97.6% qualified for an alcohol use disorder, and 40.6% qualified for a drug use disorder. Forty-five percent (44.5%) of the sample qualified for a psychiatric disorder that was not substance related (i.e., alcohol, nicotine, or other drug) or gambling related. The most prevalent of these were conduct

disorder (17.8%) and posttraumatic stress disorder (13.3%). Table 1 summarizes prevalence rates for all lifetime disorders. Logistic regressions demonstrated that 4 of the 14 measured lifetime disorders varied by age in our sample. Younger offenders were more likely to qualify for lifetime diagnoses of drug abuse (Wald's statistic = 13.1, $p < .001$, $\text{Exp}(B) = 1.03$), drug dependence (Wald's statistic = 11.3, $p < .01$, $\text{Exp}(B) = 1.03$), and conduct disorder (Wald's statistic = 11.7, $p < .01$, $\text{Exp}(B) = 1.03$). Older offenders were more likely to qualify for nicotine dependence (Wald's statistic = 6.6, $p < .05$, $\text{Exp}(B) = 0.98$).

Past 12 months. The past 12-month rate of alcohol use disorders (73.5%) was slightly lower than was the lifetime rate; the past 12-month prevalence rate of drug use disorders (10.0%) was much lower than was the lifetime rate. During the previous 12 months, 28.9% of the sample had experienced symptoms that qualified them for a psychiatric disorder that was not substance related or gambling related. Posttraumatic stress disorder (11.5%) was the most prevalent of these disorders. Table 1 summarizes the prevalence rates for all disorders that participants experienced within the previous 12 months. Logistic regressions demonstrated that 5 of the 14 measured past-year disorders varied by age in our sample. Younger offenders were more likely to qualify for past-year diagnoses of alcohol abuse (Wald's statistic = 6.7, $p < .05$, $\text{Exp}(B) = 1.02$), drug abuse (Wald's statistic = 10.0, $p < .01$, $\text{Exp}(B) =$

1.06), drug dependence (Wald's statistic = 15.6, $p < .001$, $\text{Exp}(B) = 1.07$), and conduct disorder (Wald's statistic = 9.9, $p < .01$, $\text{Exp}(B) = 1.09$). Older offenders were more likely to qualify for pathological gambling (Wald's statistic = 4.3, $p < .05$, $\text{Exp}(B) = 0.94$).

Comparison with NCS-R. To compare repeat DUI offenders with a normative community sample, we examined lifetime and past-year rates for those disorders, which were available from the general household population surveyed as part of the NCS-R (Kessler, Berglund, et al., 2005; Kessler, Chiu, et al., 2005). We adjusted the NCS-R rates to approximate the gender composition in our sample (i.e., 19% female, 81% male, as compared with 53% female, 47% male) using the tables available on the NCS website (http://www.hcp.med.harvard.edu/ncs/ftpd/table_ncsr_by_gender_and_age.pdf).² Criteria for all diagnoses except alcohol and drug disorders were identical, because both studies employed the same CIDI instrument. We used a slightly modified computer algorithm to calculate alcohol and drug abuse and dependence in order to accurately capture both lifetime and past-year rates.³ In Table 1, asterisks mark statistically significant differences between prevalence estimates derived from our sample and from the general population.

As Table 1 shows, repeat DUI offenders had significantly higher lifetime rates than did the general population for alcohol and drug use disorders, as well as for nicotine dependence. Similarly, conduct disorder, posttraumatic stress disorder, mania, and generalized anxiety disorder were significantly elevated in our sample. There were no differences between the two samples for major depression, dysthymia, intermittent explosive disorder, or attention-deficit disorder. Table 1 also shows that differences in past-year diagnoses reveal a pattern similar to that of lifetime diagnoses, though diagnoses of past-year major depression and of dysthymia were significantly elevated in our sample, which was not the case for the lifetime diagnoses of these disorders.

Comorbidity of Psychiatric Disorders With Addiction-Related Disorders

To measure comorbidity, we first calculated the number of disorders reported as co-occurring for each individual. We then analyzed comorbidity patterns for each individual and collapsed these into six primary comorbidity categories: (a) no disorders, (b) only alcohol-related disorders, (c) alcohol disorder comorbid with other addictions, (d) addiction-related disorder(s) comorbid with one other disorder, (e) addiction-related disorder(s) comorbid with two other disorders, and (f) addiction-related disorder(s) comorbid with three or more other disorders. Table 2 summarizes the results for these categories. As before, we present these descriptive analyses for both lifetime and past-year diagnostic time frames. For lifetime diagnoses, comorbidity does not indicate temporal co-occurrence. For past-year diagnoses, comorbidity indicates co-occurrence of disorders within that 12-month time frame.

Lifetime. As shown in Table 2, 35.0% of the sample qualified only for lifetime diagnosis of alcohol abuse or dependence, and 19.5% qualified only for addiction-related disorders (i.e., alcohol abuse/dependence and drug abuse/dependence, nicotine dependence, and/or pathological gambling). More than 43% of participants qualified for one or more lifetime disorders in addition to

Table 2

Lifetime and Past-Year Comorbidity Patterns Among Repeat DUI Offenders ($N_{MDUIL} = 729$)

Pattern	Lifetime prevalence (%)	Past-year prevalence (%)
No disorders ^a	1.1	16.5
AA or AD only ^a	35.0	42.7
Only disorders other than addiction-related disorders ^a	0.7	5.9
Addiction-related disorders only (AA/AD, DA/DD, ND, PG)	19.5	11.9
Addiction-related disorders + 1 other disorder	26.1	14.8
Addiction-related disorders + 2 other disorders	10.3	5.2
Addiction-related disorders + 3 or more other disorders	7.4	3.0

Note. DUI = driving under the influence (of alcohol); MDUIL = Middlesex Driving Under the Influence of Liquor Program; AA = alcohol abuse; AD = alcohol dependence; DA = drug abuse; DD = drug dependence; ND = nicotine dependence; PG = pathological gambling.

^a Past-year rates for these instances of no or single disorder occurrence (i.e., no disorders, alcohol disorders only, disorders other than addiction only) are higher than lifetime rates because overall comorbidity in the sample is lower past year than lifetime.

addiction-related disorders. The majority of participants who had only comorbid addiction-related disorders exhibited alcohol abuse/dependence and drug abuse/dependence. Participants who experienced only one other comorbid disorder with their addiction-related disorders were most likely to have conduct disorder. No single pattern of lifetime comorbidity was more common than

² We also compared our sample and the NCS-R sample using NCS-R rates unadjusted for gender. The only differences between these two sets of analyses were that (a) the lifetime rate of depression in the NCS-R sample was significantly greater than that in the MDUIL sample, (b) the past-year rate of conduct disorder in the MDUIL sample was significantly greater than that in the NCS-R sample, and (c) the differences between past-year rates of major depression and dysthymia in the two samples were no longer significant when NCS-R rates were left unadjusted.

³ The only variations between diagnoses in the current study and those in the NCS-R involved alcohol and drug abuse and dependence. First, we modified the CIDI gateways that determined whether participants would be asked about symptoms of alcohol use disorder and drug use disorder. As programmed, Version 19.101 of the CIDI screens people out of these modules prior to asking about symptoms if participants indicate that their heaviest drinking period was in the past 12 months. We fixed this gating problem to correctly include these people if the frequency and the amount of their drinking in the past 12 months met documented CIDI criteria. We reported this problem, and the next version of the World Mental Health-CIDI (post-NCS-R) included this revision. The second variation between our reporting and that from the NCS-R involved the distinction between abuse and dependence. For alcohol abuse and drug abuse, the findings reported from the NCS-R did not exclude individuals with alcohol dependence and drug dependence, respectively. Therefore, to assure comparability, we adjusted the NCS-R rates reported here for substance abuse by subtracting that sample's dependence rates. (For example, the NCS-R reports a lifetime alcohol abuse rate of 13.2% and a lifetime alcohol dependence rate of 5.4%; for this comparison, the NCS-R lifetime alcohol abuse rate is adjusted to 7.8%.)

others for participants who qualified for two or more non-addiction-related disorders. Regression analyses demonstrated that younger offenders qualified for significantly more comorbid disorders than did older offenders, $\beta = -.09$, $t(728) = -2.5$, $p < .05$, but age accounted for less than 1% of the variance in comorbidity.

Past 12 months. As summarized in Table 2, 16.5% of the sample qualified for no disorders, and 42.7% qualified only for past-year alcohol abuse or dependence. More than 30% of the sample reported a co-occurrence of disorders within the past year, with 11.9% qualifying only for comorbid past-year addiction-related disorders and 23.0% qualifying for one or more past-year disorders in addition to past-year addiction-related disorders. Past-year anxiety-related disorders and bipolar disorders continued to co-occur with addiction-related disorders at prevalence levels similar to those for the corresponding lifetime estimates. Posttraumatic stress disorder was the most commonly occurring disorder comorbid with the addictions during the past 12 months. Regression analyses demonstrated that younger offenders qualified for significantly more past-year comorbid disorders than did older offenders, $\beta = -.09$, $t(728) = -2.5$, $p < .05$; again, age accounted for less than 1% of the variance in comorbidity.

Comparison with NCS-R. In papers analyzing the NCS-R, Kessler and colleagues report the prevalence of lifetime and 12-month comorbidity. For lifetime comorbidity, they use the categories "any disorder," "two or more disorders," and "three or more disorders" (Kessler, Berglund, et al., 2005). For past-year comorbidity, they use the categories "any disorder," "one disorder," "two disorders," and "three or more disorders" (Kessler, Chiu, et al., 2005). For purposes of comparison, we reanalyzed our data using the NCS-R classification schema and including only disorders that were measured in the NCS-R and reported in available published papers. Because the NCS-R also included seven disorders not measured in the current repeat DUI study (i.e., panic disorder, specific phobia, social phobia, agoraphobia, separation anxiety

disorder, obsessive-compulsive disorder, and oppositional defiant disorder), the current comparisons, illustrated in Figure 2, should be considered conservative.

Despite the conservative estimates of co-occurring disorders in the repeat DUI sample, comorbidity among repeat DUI offenders was significantly higher than it was in the general population, within both a lifetime and a past-year time frame.

Multiple DUI Offending and Prevalence and Comorbidity of Psychiatric Disorders

If, as we suggest, it is important to consider DUI offenders who reoffend separately from first-time offenders, the question arises whether mental health issues increase as DUI arrests increase. In our sample, 35% of offenders have more than two arrests. Chi-square analyses demonstrated that these offenders were more likely to qualify for a lifetime diagnosis of alcohol dependence, $\chi^2(1, N = 729) = 4.8$, $p < .05$, $\phi = .08$, and were less likely to qualify for a past-year diagnosis of alcohol abuse, $\chi^2(1, N = 729) = 8.3$, $p < .01$, $\phi = -.11$, than were offenders with two DUI arrests. This group did not differ on rates of other disorders from those with two DUI offenses. Offenders with four or more arrests demonstrated the same pattern: They were more likely than the rest of the sample to qualify for a lifetime diagnosis of alcohol dependence, $\chi^2(1, N = 729) = 5.0$, $p < .05$, $\phi = .08$, and, consequently, were less likely to qualify for a lifetime diagnosis of alcohol abuse, $\chi^2(1, N = 729) = 3.9$, $p < .05$, $\phi = -.07$. This finding was observed just below statistical significance when we considered offenders with three or more arrests. Offenders with four or more arrests also were less likely to qualify for past-year alcohol abuse, $\chi^2(1, N = 729) = 8.5$, $p < .01$, $\phi = -.11$, than was the rest of the sample. Overall, 37.8% of offenders who reported two arrests, 43.2% of offenders who reported three arrests, and 51.7% of offenders who reported four or more arrests qualified for a lifetime

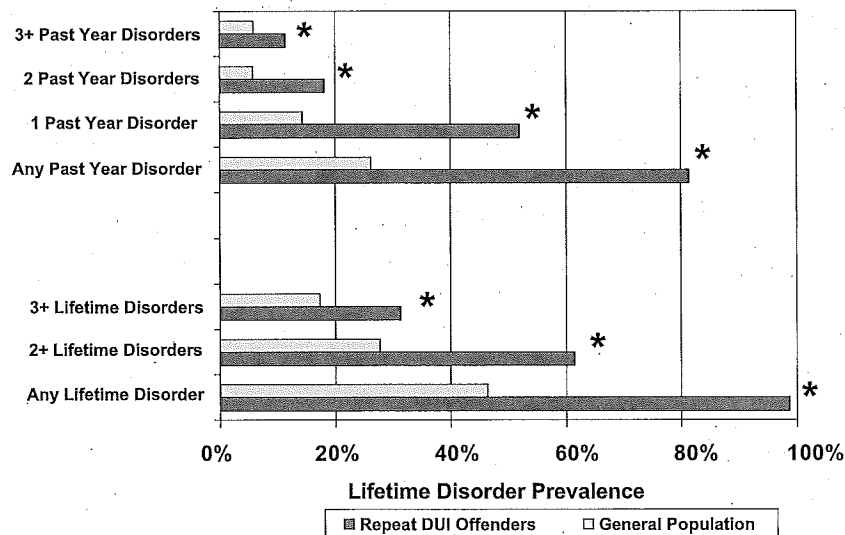


Figure 2. Comparison between repeat DUI offenders and general population (NCS-R) comorbidity of psychiatric disorders. Counts for repeat DUI offender sample are based only on disorders measured by both this study and the NCS-R. DUI = driving under the influence (of alcohol); NCS-R = National Comorbidity Survey Replication. * $p < .001$.

diagnosis of alcohol dependence. Offenders with more DUI arrests were not more likely to exhibit comorbidity (i.e., to qualify for more lifetime or past-year disorders), whether we compared offenders with three or more reported arrests or offenders with four or more reported arrests with the rest of the sample.

Discussion

Almost 100% of our repeat DUI sample qualified for a lifetime diagnosis of alcohol abuse or dependence, and three quarters of the sample met criteria for one of those diagnoses within the past year. This finding is consistent with Lapham et al.'s recent study (2006) of repeat DUI offenders. In their sample of primarily first-time DUI offenders, Lapham et al. (2001) observed lifetime rates of alcohol-related disorders that were similar to the rates reported here; however, the past-year rates for their first-time sample (34.4% for women and 40.0% for men) were considerably lower than in both their repeat DUI offender sample (70.6%) and our repeat DUI offender sample (73.5%). This finding suggests that alcohol use disorders reported by repeat DUI offenders in treatment persist, unlike those reported by first offenders. In addition, number of DUI offenses in our sample was associated specifically with greater likelihood of alcohol dependence. We can speculate about the many reasons for this association; one possibility is that alcohol dependence not only increases the likelihood of DUI but might increase the likelihood of getting caught, because of the increased severity and duration of alcohol-related morbidity (Yu et al., 2006). However, it also is possible that when offenders are arrested multiple times for DUI, it increases their recognition of alcohol-related problems and reduces their resistance to reporting symptoms.

Our findings confirm and expand the past findings of psychiatric comorbidity among DUI offenders that were discussed earlier. More than 60% of our sample qualified for a lifetime mental disorder in addition to alcohol-related problems. Strikingly, almost half of the sample (45%) met criteria for a lifetime diagnosis of a mental disorder that was not substance related. Comorbidity was considerably elevated in this sample compared with the general population, and either lifetime or past-year prevalence rates were significantly higher than were those for the general population for 10 of 12 disorders. In particular, repeat offenders in treatment had elevated rates of posttraumatic stress disorder, both current and lifetime, and were more likely than was the general population to have a lifetime diagnosis of conduct disorder or of bipolar disorder.

The extent of anxiety-related disorders experienced by this sample suggests an interaction between alcohol and anxiety among repeat DUI offenders. This is not surprising, given previous research on the co-occurrence of anxiety and of alcohol use disorders (Kessler et al., 1997), though the most recent national survey, the National Survey on Alcohol and Related Conditions (NESARC), reported that this comorbidity was limited to alcohol dependence (Grant et al., 2004, 2005). One might wonder why the rates are not higher; the National Comorbidity Study (NCS) found that 23% of participants with lifetime alcohol abuse and 36% of participants with lifetime alcohol dependence also evidenced lifetime anxiety-related disorders. However, the NCS included multiple anxiety disorders not included in the current study (e.g., phobias and panic disorder). In addition, the version of the CIDI that we used for this

study included clinical significance criteria (i.e., participants were required to report qualifying symptoms and to acknowledge that these symptoms have had a serious impact on their ability to function) that were not included in the original NCS. Given the comparability of our instrument to that used in the NCS-R, comparison of our results with those for participants with alcohol use disorders will be interesting. Though the current data do not inform us about the temporal patterns of anxiety and of alcohol use, it is likely that some of these repeat offenders use alcohol to cope with the trauma and anxiety they experience. It also is possible that anxiety disorders emerge as a result of excessive alcohol use and of dependence.

Compared with the rate for the general population, the lifetime rate of depression in this sample is not elevated; this seems surprising, given past work that links substance use disorders to depression (Kessler et al., 1997, 2003). There are several possible explanations for this finding. Our sample of repeat offenders might regard their depressive symptoms as physical consequences of their drinking behavior, which would preclude a diagnosis for depression in the CIDI. It is also possible that repeat offenders who experience depressive episodes tend to experience mania; this circumstance qualifies them for bipolar disorder instead of major depression. Extending this interpretation, repeat offenders in treatment appear to "act out" rather than "act in" (e.g., Krueger, Caspi, Moffitt, & Silva, 1998). The symptom patterns of repeat offenders tend to qualify them for externalizing disorders, such as substance-related disorders and conduct disorder. These behaviors might be responses to negative emotions that others internalize and do not discharge. However, Lapham et al. (2006) found a much higher lifetime rate of depression (30.9%) among their sample of repeat DUI offenders. Given that they used a similar instrument, this higher rate might be due to regional differences—Lapham et al. obtained their sample in a northwestern city—but the divergent findings clearly merit further investigation. Results from the NESARC study indicate that, in a nationally representative sample, depression is more strongly associated with drug use disorders than it is with alcohol use disorders; within alcohol use disorders, depression is associated more strongly with dependence than it is with abuse (Hasin, Goodwin, Stinson, & Grant, 2005). Further examination of our study sample might reveal elevated depression among subgroups with alcohol or drug dependence. As we mentioned earlier, now that the data are available for the NCS-R, we will need to compare our results with those for participants with alcohol use disorders in that sample.

Age is an important factor for those considering repeat DUI offenders: We found that younger offenders were more likely to have lifetime and past-year drug use disorders than were their older counterparts. Kessler et al. (Kessler, Berglund, et al., 2005; Kessler, Chiu, et al., 2005; see also http://www.hcp.med.harvard.edu/ncs/ftpdir/table_ncsr_by_gender_and_age.pdf) observed similar patterns of both lifetime and 12-month comorbidity. Studies have confirmed that young people tend to have more externalizing patterns of behavior (e.g., substance use) than do their older counterparts, a finding that suggests different diagnostic population segments. However, it also is possible that the observation of this pattern among lifetime prevalence estimates reveals a self-report artifact: Older participants might not recall or report as many symptoms as do younger participants. More research is necessary for clarification of these findings.

Treatment Implications

Our findings support the proposal that conventional DUI treatments and interventions that focus primarily on education and on punishment likely are insufficient for dealing with the observed level of psychiatric comorbidity among repeat DUI offenders. Despite the evidence that DUI offenders are a heterogeneous group and that cognitive-behavioral and treatment-matching approaches have shown promise for limiting relapse within contemporary treatment programs (e.g., Donovan et al., 1983; Glass et al., 2000; Wells-Parker et al., 2006; Wells-Parker & Williams, 2002), current DUI-related public policy in theory and action inadvertently tends to support a one-size-fits-all approach to treatment for DUI offenses. Limited resources combined with the demands of public policy governing DUI treatment encourage current DUI treatment programs to focus on the obligatory education about drinking (i.e., alcohol abuse and dependence) and driving; even the most comprehensive DUI programs often do not have the resources necessary for addressing the variety of psychiatric needs among their patients. However, the extant scientific literature and this study describe a heterogeneous offender population with extensive psychiatric comorbidity that requires more comprehensive treatment options for maximizing clinical outcomes and for reducing the incidence of renewed DUI offenses (C'de Baca et al., 2001; Reynolds, Kuncie, & Cope, 1991; Wieczorek & Miller, 1992).

Limitations and Future Directions

The current data are derived from a sample of repeat DUI offenders that was confined to a single treatment program in Massachusetts. Despite the evidence showing that this sample is representative of repeat DUI offenders in Massachusetts who elect a treatment sentence option, these findings need to be replicated in additional settings and in communities in other states. In Massachusetts, offenders mandated to treatment can refuse this sentencing option and can serve 30 or more days in prison instead. Thus, our findings are specific to offenders who agree to attend a 2-week inpatient program and outpatient aftercare program in place of 30+ days in prison. Further, the language and cognitive exclusions required for CIDI administration likely skewed the results in a conservative direction. It is reasonable to expect higher rates of psychiatric disorder and of comorbidity among those excluded for cognitive difficulties.

The current research provides a comprehensive and systematic study of psychiatric comorbidity in a sample of repeat offenders. Understanding the role that mental health issues play in this population, for which current legal sanctions are not completely successful, is particularly important for prevention and treatment of DUI behavior. Given the prevalence of psychiatric disorders among repeat DUI offenders in treatment, future research needs to (a) identify the causal relationships among psychiatric disorder, alcohol problems, and DUI behavior; (b) investigate whether the patterns of psychiatric comorbidity among repeat DUI offenders differ for men and for women; (c) examine the factors that distinguish repeat offenders from onetime offenders; and (d) structure and evaluate treatment to address the psychiatric issues that contribute to repeat DUI behavior.

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